

ABSTRACT OF THE DISCLOSURE

The novel methods, apparatus and reworked rotary braking surface product, for example those exhibited on interior cylindrical braking surfaces of a cast iron brake drum, serve to replace manufacturing defects exhibiting residual tensile stresses and outwardly directed tool marks with smooth compressed braking surfaces in a final manufacturing stage. The plastically deformed surface shape with reduced roughness and surface irregularities furthermore presents improved braking strength above the yield point and approaching the ultimate material strength of the base drum material. An ultrasonic transducer drives individual freely moving impact elements of a set at frequencies up to 55 kHz into the braking surface to effect plastic deformation at surface and sub-surface layers. Physically, the small sized ultrasonic transducer is inserted into a drum cylinder and driven by a lathe producing relative motion between the braking surface and the ultrasonically vibrating impact elements scanning only the braking surface in a readily controlled ultrasonic impact machining cycle for attaining specified braking surface performance.